

"Twenty years of Japanese research, and prospects for the future"

Towards the close of the 1930's, the senior author of the present article read over a collection of reports of field studies on non-human primates by foreign scientists, with the intention of organizing and crystallizing in his mind a generalized concept of "plant and animal sociology", and in the process not unnaturally came across the work of C.R. Carpenter, together with his account of field investigations on howling monkeys<sup>1</sup> and gibbons<sup>2</sup>. Later, and with the termination of World War II, he undertook a series of field studies on the semi-wild horses of Toimisaki, Miyazaki Prefecture, employing for the first time the method of "individual discrimination", on the basis of information and suggestions gleaned from Carpenter's work among the rhesus monkeys running wild on Santiago Island<sup>3</sup>.

At that time, in the wake of defeat, there seemed only one course left open to us if we ourselves, as scientists, were to achieve results comparable with those of the United States. This would be to avoid projects requiring considerable financial resources, and those inherently incapable of fairly rapid completion. Indeed, such projects would probably be more attractive to the Americans themselves, who alone possessed the resources necessary to ensure success. Our course, as we saw it, inevitably lay in a contrary direction, one where final conclusions would only be the outcome of many years of painstaking and cumulative research. In this way, we wondered if we might not perhaps be able, at least in some measure, to surpass the achievements of our foreign counterparts.

Adopting such an approach, it seemed to the senior author that the sociological studies on animals which he had so often contemplated, and wished

to embark upon, amply met the conditions that had been thrust upon us. There appeared no justifiable reason for delay.

Of the various methods which lay open for undertaking such a project the senior author decided that we should attempt more than to merely collect facts about the features and habits of the animals themselves. He thought it better to seek to actually enter animal communities, and in the place of the animals, who lacked not only a language but also of course even the rudiments of a graphic system, to record the underlying dynamics of their social systems. His plan was to be one which traced the historical course and nature of animal societies, an aspect which could not quickly be ascertained and whose description would stand upon the accumulated results of long-term observations and records. Furthermore, this new mode and topic of investigation, which we hoped to pioneer and perfect by ourselves, called only for simple tools: a pair of binoculars, field notebooks, and pencils. For the rest we would have to call upon our own spirit of endurance and endeavour.

An essential prerequisite for such a study was to learn the faces of all members of the particular society in question, and to train ourselves for rapid individual identification, in other words the "individual discrimination" mentioned above. For this purpose names or numbers were given to each animal as it became separately distinguishable, until all the members were known. Lacking knowledge of this kind it would of course be impossible to accurately trace the movements and behaviour of all members of any one society individually.

#### Field studies on Japanese monkeys

In 1948, the present authors together with their co-worker Syunzo Kawamura first came into contact with a group of Japanese monkeys (*Macaca fuscata*) in Toimisaki, and these animals encouraged us to investigate similar colonies of monkeys known to inhabit the island of Kōshima. In 1951, at the suggestion

of the late Toichi Kanchi, we began a programme of supplying sweet potatoes to these animals, and in the August of 1952 succeeded in feeding them directly. Furthermore, in the following February, a much larger group of monkeys on Takasakiyama was able to be feed under the auspices of the mayor of Oita City. Since in this way a really close social contact was formed between men and monkeys, Imanishi proposed a special term for such a relationship, namely 'provisionization'. *Imanishi Ueda*

In the course of such events Itani who had in fact been investigating the monkeys on Takasakiyama since 1950, became sufficiently acquainted with the individual features of the monkeys to enable him to make individual identifications for most members of the group. In turn it gradually became possible to establish the system of group organization. All monkeys of the group could be classified as members of one or other of four classes: leaders, sub-leaders, peripheral males, and females. At the feeding place members of the leader and female classes held a central part, peripheral males occupied a peripheral position, while sub-leader monkeys occupied the boundary area between the central and peripheral areas. Furthermore, a system of linear hierarchy was observed within the leader and sub-leader classes, and extended down into the higher-ranking peripheral males.

These conclusions all followed from Itani's work<sup>4</sup>, and for a time the Takasakiyama monkeys were considered as a model of group organization.

Later investigations of the monkeys on Kōshima revealed that in such a small group a comparable system of linear hierarchy also existed among the females. In addition, it was found that the dominance rank was affected by kinship ties, that is to say female offspring from high-ranking females tended to achieve dominant positions in the group. Moreover, Masao Kawai<sup>5</sup> (another of our co-workers) used his observations to develop the concepts of "dependent rank" and "basic rank". In terms of class categories the "basic rank" was

leaders > sub-leaders > peripheral males > females. However, the female class held second position to the leader class so long as there was a leader in the centre, the dominance order being leaders > females > sub-leaders > peripheral males. Under such circumstances, the females' dominance rank should be regarded as a (leader-) "dependant rank". If at any time the highest ranking monkey was of the sub-leader class, this sub-leader held the central position, and the dominance order was sub-leaders > females > peripheral males. Under these circumstances, therefore, the females' dominance rank should be regarded as a (sub-leader-) "dependent rank".

Following these early studies, groups of monkeys in different areas became objects not only of scientific investigation, but also of tourist sight-seeing. As a result of this, with the consequent "provisionization", it became clear that their behaviour did in fact exhibit some degree of differentiation from group to group. The numbers of researchers grew, so that as well as members from Kyoto University and Osaka Municipal Universities, we had an additional research group from an Osaka University group, <sup>which</sup> who joined us in 1957. The behaviour patterns of the monkeys were found to differ not only according to class, and status among the class, but also according to whether they were acting, under any given set of circumstances, as integral members of the group, or in isolation from the group. Investigations of this kind accentuated the importance of field studies on monkeys, at the same time confirming the need for an historical approach, to determine long-term changes and to reveal the interdependence of variations in status and the effects of genealogy.

In our work so far we have already dealt with over twenty different groups of Japanese monkeys. As regards long-term observations, we have kept up a continuous observation of the Kōshima and Takasakiyama groups, and so accumulated a vast amount of data. Indeed, we should count ourselves fortunate that our native country has a considerable indigenous monkey population, and



hence ample opportunity for studying them closely.

On the occasion of the 1957 Pan Pacific Congress held in Bangkok, Kawamura<sup>6</sup> presented a review of our research up until that time and, owing to the fact that the international audience of scientists present had been entirely unaware of our work, the results produced no small degree of surprise. Even the Japanese academic world regarded our studies with some reservation. This may in part be explained by the lack of any tradition for the field studies of comparatively large-sized mammals in Japan. In other words it may be said that hitherto activity within the field of mammalian research had tended to be confined to animal husbandry and to projects of medical significance. Be that as it may, we should clearly acknowledge the influence of the happy chance that brought so many of us - frankly more suited to field investigations than to laboratory work - all into one laboratory.... a meeting so fruitful for the subsequent progress of our work.

After the studies on Japanese monkeys had continued for approximately ten full years, we began to consider looking farther afield to South East Asia, Africa, and to South America, in search of foreign monkeys and apes which might lend themselves to our techniques. This by no means implied the abandonment of our work on Japanese monkeys, indeed it continued and is still in progress. We did feel, however, that our work had reached the stage where the next new development should be to undertake inter-specific comparative studies. Thus it was that we left Japan, where we were limited to a single indigenous species, and set off in search of suitable countries and localities for the furtherance of our investigations.

#### Field studies on exotic non-human primates

A series of investigations was instituted, and still continues, in South East Asia, with Kawamura playing a central role in the years since 1957.

Moreover, in 1960 and again in 1962, Kisaburo Tokuda made observations on various species of South American non-human primates. However, and above all else, a programme to study hanuman langurs (P<sup>+</sup>resgytis entellus) was undertaken as a joint Japanese-Indian venture, with Kawamura, Yukimaru Sug Sugiyama and the late Kenji Yoshida the Japanese representatives. Excellent results were obtained<sup>7</sup>, and successful individual discrimination achieved among such animals. However, and in contrast to the Japanese monkeys, this was not as a result of provisionization but simply by gradually making the langurs familiar with, and accustomed to, the presence of men. Such a method of approach has been called "habituation".

In Africa, Imanishi and Itani developed studies on anthropoid apes. During the first three years, 1958-1960, they concentrated on the mountain gorilla (Pan gorilla beringei), later switching to the chimpanzee (Pan troglodytes schweinfurthii) from 1961 onwards.

Our choice of gorillas and chimpanzees was by no means a haphazard one. Indeed, we selected such animals from among the many kinds of monkeys which abound in Africa on the basis of the fact that our prime interests were not limited simply to the comparative sociology of non-human primates as a whole, but extended also to the evolutionary aspects of society, with particular reference to the origin and development of man himself. Furthermore, since we knew that the only scientific means of approach to an accurate conception of the state of proto-hominoid societies must lie in the collation and organization of data from known hunting-gathering communities and from existing anthropoid societies, we chose to concentrate on the latter. Correlations, we recognized, would come later by coordination with the studies of cultural anthropologists.

With the above as our ultimate objective, our studies have finally found sponsorship and an appropriate office in the Physical Anthropology Laboratory

(Faculty of Science) at Kyoto University, after having passed through a time at the Social Anthropology Laboratory (Research Institute for Humanistic Studies), following their initial commencement<sup>in</sup> under the auspices of the Japan Monkey Centre.

Although as mentioned above the presentation of our results in Bangkok in 1957 came as something of a surprise to the assembled scientists, Japanese field studies on non-human primates now hold a respected position. However, during the process of their studies in Africa, we too were not without our surprises.

After our first visit to Africa to investigate the anthropoids we found that from America too J. Emlen and S. Schaller had undertaken studies on mountain gorillas. When we moved from gorillas to chimpanzees, we discovered that J. Goodall from England had already commenced work with the chimpanzees of the Gombe Stream Game Reserve. Again, though not at the same time as ourselves, A. Kortlandt from Holland (in the Congo), and V. and F. Reynolds from England (in Uganda) also undertook chimpanzee studies.

At about that time, field investigations of not only gorillas and chimpanzees, but also of non-human primates in general, had aroused world-wide interest. Should we assume that this widespread tendency was merely fortuitous? Might it not rather be due to the rapidly increased awareness of the value of monkeys as experimental animals? Probably of even greater importance than this, however, was the discovery in rapid succession of fossil remains of early man, and the consequent increased appreciation of the affinity between man and the higher primates.

It seems to be a general tendency of the Japanese academic world, when any particular topic of foreign research has moved into the limelight, to seek to introduce it as quickly as possible into Japan. Nevertheless, our own reasons for pursuing this research were rather different. We had originally

been encouraged to start studies by the presence of monkeys in Japan, and, the outcome of several years of work in Japan had prompted us to move overseas, where we had happened across foreign workers in search of Monkeys and apes, who themselves hailed from countries lacking indigenous species.

For sociological investigations, the mere existence of a suitable animal species is not enough. It is also necessary that the animals form a group of suitable size, and that there exist other similar groups inhabiting the same general area. Our studies on gorillas began and ended in the search for such groups, whereas Schaller located a veritable treasure-house of these animals, Kabara in the Virunga volcanoes, enabling results of an outstandingly high standard<sup>8</sup>.

In the case of chimpanzees too we experienced considerable difficulty. Although we were able to locate many groups, it was a long time before we actually came across a locality which met our needs by fulfilling all the requisite conditions. To add to our difficulties, the method of provisionization, which had worked so well with the Japanese monkeys, was at first quite fruitless. Nevertheless, T. Nishida<sup>9</sup> finally succeeded in 1966 in provisionizing the Kasoge group, and after accustoming himself to individual discrimination established that the group then consisted of twenty-one chimpanzees. In the same year Sugiyama<sup>10</sup> succeeded in individual discrimination for a group of chimpanzees in the Bwindi forest, Uganda, by employing the method of habituation which he had formerly practised among the langurs of India. He was able to show that the group with which he dealt comprised more than forty animals.

It had been conjectured by investigators such as Goodall and Reynolds that chimpanzees repeatedly joined and parted without making any coherent groups comparable to those known among other primates. Thus, Goodall<sup>11</sup> and



others suggested that the only social units apart from that of mother and child were loose communities including all those arbitrarily and temporarily associating individuals.

We ourselves found it difficult to entertain the idea that highly evolved animals like chimpanzees would exist solely in such amorphous societies. Indeed, Itani and Suzuki<sup>11</sup>, in 1965, happened to chance upon a comparatively large collection of some forty-three chimpanzees together on the march at Filabanga. This led us strongly to believe that the group was coherent, and therefore a true social unit. These early convictions were later confirmed by the work of Nishida and Sugiyama. The difficulties we encountered in the early stages were eventually surmounted, and as a result we were able to force open the tightly closed door which faces any previous investigator of chimpanzees.

Itani<sup>12</sup> referred to such groups as "pre-bands" and thought of them as the true social unit of chimpanzees. Nevertheless, individuals do in fact freely link up with and part from these groups, and there is no fixed sub-structure beyond the mother-child bond. Concerning sexual behaviour, Goodall's report of several males in succession mounting a single estrous female has been confirmed by the observations of Nishida and Sugiyama. However, and this is highly significant, although superficially the larger groups appear to be somewhat fragmentary, they are indeed coherent groups, each with its own clearly defined nomadic range. It is when the nomadic ranges of two such groups overlap to any extent that there is a degree of social intercourse or "coming and going" between the members.

It may be inferred from the above that it is the association of several such groups, through their neighbourhood relationships, which together would constitute a kind of "community" posited by Goodall. In the community each group of chimpanzees is a coherent social unit, but may not always be an

independent breeding unit. The true breeding unit may in fact rather be a community stretching over several groups held together by neighbourhood relationships. This appears to be a major point of contrast with Japanese monkeys (and the majority of other non-human primates), for each group of Japanese monkeys is in itself a social unit, and at the same time, by in-breeding, a breeding unit. This major contrast is clearly evidenced by the attitude of two adjacent groups. They defend their respective territories, and the relationship between them is both exclusive and hostile. This remains generally true even though some degree of social interchange might be possible through, say, the acceptance of an isolated single male.

Further, the Filabanga group of forty-three chimpanzees discovered by Itani, despite its size, appeared to contain no young adult males. This tends to support the contention that there is freedom to roam throughout the entire community, the young males being able eventually to settle in some group suitable to them.

Gorillas resemble chimpanzees in that their communities are composed of several groups held together by neighbourhood relationships. They differ only in that even the largest groups, with up to thirty animals, are generally headed by a single male who acts as leader.

In the case of gibbons, also classified as anthropoid, one social unit consists of one male, one female, and their offspring. Each unit preserves its own territorial range, and is hostile to other nearby groups, without developing neighbourhood relationships. In this respect, they are rather similar to Japanese monkeys. In the matter of breeding units, however, it is probably more correct to think in terms of several social units taken together than just of the individual unit. Thus, we may even think in terms of a "latent community" among the gibbons, similar to the community among gorillas and chimpanzees, where territorial distinctions are less sharply

drawn and neighbourhood relationships have developed.

### The basis of human societies

Our studies on anthropoid societies, as mentioned above, were always regarded as one important aspect of a much broader interest in the origins of human societies. The basic unit of human society is the family. Imanishi<sup>13</sup> identifies four characteristics of the human family, the first three of which are closely interconnected, namely the existence of an incest taboo, the practice of exogamy, and the existence of community organization in the society. The fourth is the division of labour between ~~male and female~~<sup>male and female</sup> ~~man and wife~~. Since to make incest taboo is to deny the independent procreation of any one family unit, human society depends upon the development of a compatible system for exogamic reproduction. This requires that the community contains a sufficiently large number of fertile individuals. S.L. Washburn and L. Lancaster<sup>14</sup> have suggested that the minimum size necessary for a viable community might be about five hundred individuals. In the case of single bands of primitive hunter-gatherers consisting of some fifty persons, a collection of ten such bands would constitute a single community and marriage unit. The numbers of individuals involved are thus considerably greater than those for the anthropoid communities so far considered.

The present authors have sought a key to the origins of the incest taboo in the self-isolation of young males. This phenomenon is found in societies of Japanese monkeys, gibbons, gorillas and chimpanzees. However, we have not yet been able to formulate a theory along these lines. Phyllis Jay<sup>15</sup> has recently indicated (as Imanishi<sup>16</sup> had previously) the significance of the complete disappearance of the estrous cycle among females of the human species, in marked contrast with the situation among female chimpanzees. Any fully developed theory of the origins of the incest taboo must take account of

this phenomenon. As yet, field data and observations remain insufficient for any clear conclusions to be reached. For instance, in the case of the "familoid" groups named by Imanishi<sup>13</sup> (a male gibbon with his mate and offspring, or a male gorilla with his female retinue and offspring), no long-term observations have yet been made which clarify the means by which the group would continue its existence in the event that the male dies.

A sufficiently high degree of development of the cerebrum is necessary before any animal species could recognize incest as a social taboo. Even granting that among non-human primates there are early signs preceding an incest taboo, or at least an indication of phenomena around which an incest taboo might have developed, we cannot assert with any confidence that an incest taboo was already in force in the society of Australopithecus. In our estimation it would appear safer to place the emergence of a true incest taboo in the early stages of the evolution of the human genus Homo.

We conclude that in so far as human families are conditioned upon the three factors connected with incest taboo, anthropoids do not evidence true family units, nor is there support for the idea of their existence among proto-hominids.

Division of labour between husbands and wives, the fourth characteristic of human families, falls into a different category from the other three. Imanishi<sup>18</sup> and more recently Washburn and Lancaster<sup>14</sup> also, have sought the origin of this division of labour through a possible connection with hunting. Since it would be males who engaged principally in hunting, ~~since it would be males who engaged principally in hunting~~, the females of hunting-gathering communities would naturally assume the task of gathering. We can find here an essential feature of the human family which corresponds with an economic integration of daily life on the basis of food sharing.



Among baboons and chimpanzees activities not unlike hunting have been observed by several field workers, and moreover it was found by A. Suzuki<sup>17</sup> that in the case of the chimpanzee, in particular, such "hunting" was apparently confined to the males. On the other hand, an investigation by J. Tanaka<sup>18</sup> of the lives of the Bushman, a representative of African hunter-gatherers, has revealed a lower dependence on meat-eating than had formerly been supposed. It may therefore be that we must resist the temptation to seek a complete explanation of the division of labour on the basis of hunting activities alone.

Imanishi has thus been considering the idea that, quite apart from a possible connection with hunting and the origin of family, the division of labour might perhaps date from the early dawn of human prehistory. The emphasis is placed upon "economic integration" rather than upon "division of labour", such economic integration arising from the males' help and support for the females rather than from some more equable <sup>m</sup>mutual accommodation.

As a general rule the individual of existing species seems to possess the basic capacity for self-support, neither depending on others nor supporting others. At the very least they are self-supporting when it is a matter of taking food. Those individuals who lose this ability, either through old age or injury, simply perish. However, where the young are incapable of self-support the parents must provide for them, for without this parental support the species will lose the next generation. On the other hand, the care of their young must not involve the parents in the loss of their own capacity for self-support, for then both of parents and their young would perish together.

Among societies of non-human primates the mothers suckle and protect their young, but this does not impair their ability to fend for themselves. Neither does nursing their young<sup>9</sup> seem to affect their ability to take common

action with the group. Probably their continued <sup>s</sup>safety is better guaranteed by such joint action within the group than by living apart in comparative isolation.

The course of human evolution, however, has brought about birth at an earlier stage of foetal development, with a correspondingly greater impairment of the mother's joint mobility within the group. The question thus arises of whether or not the group may abandon her. Even supposing that the mother <sup>was</sup> were capable of providing for herself, it is obviously a much more precarious existence from the point of view of the conservation of species, than that within the group. We may suppose that males took on the role of individual bodyguards and provided the necessary protection. In this way the males would soon not only be acting as guards, but would also probably carry part of their hunting spoils to the females. 7/12/58

If, however, we distinguish between the concepts of "household" and "family" as D.R. Bender<sup>19</sup> has suggested, the developments outlined above would still only point to the development of households, not true families, within the group's social organization. Nevertheless, we do have some clues as to a possible mechanism for economic integration.

In the beginning <sup>if</sup> may have been that the males saw no direct connection between mating and the care of the females. Even among the males in the group of Japanese monkeys at Takasakiyama it is known that those of the leader and <sup>sub</sup>subleader classes take any responsibility for the care of the young<sup>20</sup>. In fact, despite the <sup>v</sup>development of households, it seems most likely that the mating behaviour of proto-hominids would have been quite unregulated, (ignoring any incipient incest <sup>v</sup>avoidance<sup>13</sup> much as is now seen to be the case among chimpanzee societies.

In contrast to chimpanzees, it would appear that households had already developed among early human societies, and that such units gradually evolved